

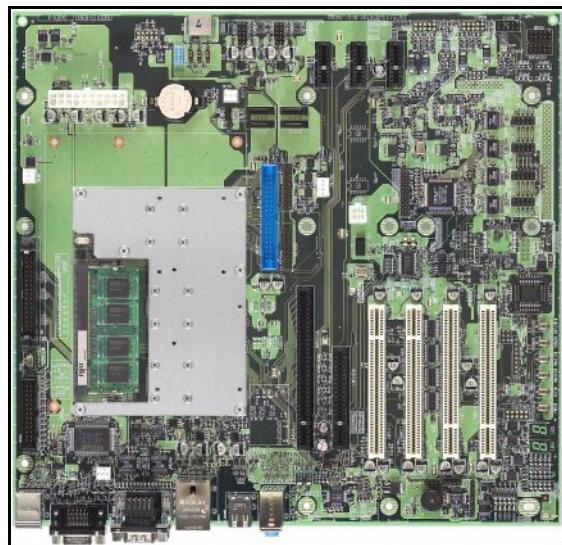
PFU Systems™

Plug-N-Run™ E1/G5 Computer-On-Module Series



COM Express Compliant

# Plug-N-Run G5 Development Board User Manual



Version 1.0

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# Introductions

Thank you for basing your system on our COM Express compliant Plug-N-Run E1/G5 Computer-On-Module, aka System-On-Module. We are confident that it will help you in getting your product to market quickly while reducing overall development cost.

This manual, *Plug-N-Run G5 Development Board User Manual*, explains the features, functions, and technical specifications for PFU Systems Plug-N-Run G5 Development Board. Specifically, it describes the board layout, connectors and jumpers, interface and mechanical dimensions.

It is recommended that you review the material contained in this manual before using the Development Board.

PFU Systems, Inc.  
February 2008

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# Package Contents

Your Plug-N-Run G5 Development Board package (PS5PRDEVBD) should contain the items listed below.

## Development Board Package

Item	Description	Qty
Development Board	Plug-N-Run G5 Development Board	1
5mm Assembly Kit	Screws with lock and flat washers	7
Insert Letter	Customer letter	1
Product Support CD	Manuals, drivers, etc.	1

Please check the package contents, and contact your sales representative or PFU Systems, Inc. if you are missing any of these items.

# Starter Kit Contents

To get a head start, you may also want to order a Development Board Starter Kit for a complete set of accessories for the Development Board. The Plug-N-Run G5 Development Board Starter Kit (PS5PRDBK) contains the items listed below.

## Development Board Starter Kit

Item	Description	Qty
FDD Ribbon Cable	34-Pin FDD cable	1
IDE Ribbon Cable	40-Pin Master/Slave ATA100 cable	1
SATA Data Cable	7-conductor SATA Data cable	2
ATX Power Supply	ATX power supply	1
SATA Power Cable	4-conductor ATX to SATA power converter	2
3.5" Floppy Disk Drive	Standard desktop floppy disk drive	1

Please check the kit contents, and contact your sales representative or PFU Systems, Inc. if you are missing any of these items.

# Other Components You May Need

In addition to the items included with the Plug-N-Run G5 Development Board package and the Development Board Starter Kit, you may also need some of the following components. These items can be ordered separately from PFU Systems, as required.

Part No.	Description
PSE1PR216X2	2.16GHz Plug-N-Run E1 Extended module
PSE1PR150X2	1.50GHz Plug-N-Run E1 Extended module
PS5PR220B2	2.2GHz Plug-N-Run G5 Basic module
PS5PR160B2	1.60GHz Plug-N-Run G5 Basic module
PSLN001G533ER	1GB PC2-4200 DDR2 ECC SDRAM 240-pin DIMM
PSVN001G533ER	1GB PC2-4200 DDR2 ECC SDRAM 240-pin VLP DIMM
MT4HTF6464HY-667E1	512MB PC2-5300 DDR2-667 SDRAM 200-pin SO-DIMM
MT8HTF6464HY-667E1	1GB PC2-5300 DDR2-667 SDRAM 200-pin SO-DIMM
SEN667-1024CER007	1GB PC2-5300 DDR2-667 SDRAM 200-pin SO-DIMM

# Related Documentation

Refer to the following documentation, in addition to this manual, when using the development board.

• Plug-N-Run E1 Hardware Reference Manual	(PS-E1PR-RM-xxx)
• Plug-N-Run E1 BIOS Manual	(PS-E1PR-BM-xxx)
• Plug-N-Run E1 Design Guide	
Hardware Design Considerations *	(PS-E1PR-DGHW-xxx)
Thermal Design Considerations *	(PS-E1PR-DGTH-xxx)
• Plug-N-Run G5 Hardware Reference Manual	(PS-G5PR-RM-xxx)
• Plug-N-Run G5 BIOS Manual	(PS-G5PR-BM-xxx)
• Plug-N-Run G5 Design Guide	
Hardware Design Considerations *	(PS-G5PR-DGHW-xxx)
Thermal Design Considerations *	(PS-G5PR-DGTH-xxx)
• Plug-N-Run G5 Development Board Design Guide *	(PS-G5PRDEV-DG-xxx)

The latest versions of these documents are available from your PFU sales representative or from the PFU Systems' web site at [www.PFUsystems.com](http://www.PFUsystems.com).

- \* Due to the confidential nature of the material in this document a Non Disclosure Agreement between the customers and PFU Systems must be executed. Please refer to your sales support person for details.

# Applicable Plug-N-Run E1/G5 Models

This manual is prepared specifically for use with the following Plug-N-Run E1/G5 models:

• 2.16GHz Plug-N-Run E1 Extended Module	(PSE1PR216X2)
• 1.50GHz Plug-N-Run E1 Extended Module	(PSE1PR150X2)
• 2.2GHz Plug-N-Run G5 Basic Module	(PS5PR220B2)
• 1.60GHz Plug-N-Run G5 Basic Module	(PS5PR160B2)

# Symbols and Safety

For your safety and that of others, follow the guidelines provided on the following pages concerning the use of the Plug-N-Run E1/G5. Symbols are used throughout this manual.

-  **Warning** Ignoring the instructions under this symbol when using the product may be hazardous or even lethal.
-  **Caution** Ignoring the instructions under this symbol when using the product may lead to injuries as well as damage to the device or hardware options.

# Plug-N-Run G5 Development Board Precautions

 **Warning** Be sure to obey the following warnings. Failure to observe these warnings may lead to potentially life threatening situations or cause serious injury.

Category	Warning
Electrical shock and fire	Do not dismantle or modify the Plug-N-Run G5 Development Board. Also, do not place anything on top of the Plug-N-Run G5 Development Board. Doing so may cause fire, electric shock or a malfunction.
	Always ensure that any device containing an embedded Plug-N-Run G5 Development Board is provided with sufficient ventilation (air holes, etc.) to keep the internal temperatures from rising excessively. Failure to do so may result in fire.
	Do not cover the device while it is operating. Doing so may cause overheating or fire.
	Do not stick your finger, etc. into the modular jack if the Plug-N-Run G5 Development Board is being supplied with power. Doing so may cause fire, electric shock or a malfunction.
Electrical shock and fire	Inserting/removing a Plug-N-Run E1/G5, device options, or connectors to/from the Plug-N-Run G5 Development Board while the power is ON may cause failure or malfunction.
	Because the electrical circuits of the Plug-N-Run G5 Development Board are exposed, conductive materials (including dust) settling on the surface of the Plug-N-Run G5 Development Board can cause short circuits, fire or a malfunction. Avoid using the Development Board in dusty environments.
	As the Plug-N-Run G5 Development Board is a bare board, with no frame or casing, a non-conductive sheet should always be spread on the workbench where the board will be used. Not doing so may cause fire, electric shock or a malfunction.
Damage and Injury	Do not dispose of the product together with other garbage. If the product is thrown into fire, it may explode.
	A running Plug-N-Run E1/G5 and Plug-N-Run G5 Development board are HOT! Touching the surface may cause burns. When a Plug-N-Run E1/G5 or Plug-N-Run G5 Development Board has to be handled, either wait for it to cool down (about 30 minutes after the power is turned off), or use anti-static heat proof gloves.

 **Caution** Ignoring the instructions under this symbol when using the product may lead to injuries as well as damage to the device or hardware options.

Category	Caution
Cause of troubles with the device	Do not install the device in a location that is extremely hot or cold or where the temperature changes drastically. Doing so may cause the device to malfunction.
	Do not use the device in an environment that is exposed to high levels of salt. Doing so may cause the device to malfunction.
	Do not place the device in areas which are subject to high levels of shock or vibration. Doing so may cause the device to malfunction.
	Do not install the device in a location where chemicals are present in the air or where it comes in contact with chemicals. Doing so may cause the device to malfunction.
	Do not place the device in areas where strong magnetic fields are generated, such as near a microwave oven. Doing so may cause the device to malfunction.
	When using the Plug-N-Run G5 Development Board, take anti-static measures to prevent permanent damage to the electronic components.
Electrical shock	Always make sure that the power supply is unplugged before attaching/removing connectors.

# Memory / Expansion Card Installation Precautions

**⚠ Warning** Before installing or removing any components, always turn the device off and unplug the power cable. Failure to do so may result in electric shock.

**⚠ Caution** **Plug-N-Run E1/G5 / G5 Development Boards Related**

- Immediately after the power is turned off, the Plug-N-Run E1/G5 and G5 Development Board will still be HOT. Please wait around 30 minutes after turning the power off or use anti-static heat proof gloves when installing or removing the Plug-N-Run E1/G5 or any of its sub-components.  
Similarly, other than when installing or removing the Plug-N-Run E1/G5, the heat spreader attached to the Plug-N-Run E1/G5 should never be touched.
- Note that the PCB and soldered areas of the Plug-N-Run G5 Development Board are exposed, and can be affected by the natural static electricity generated by the human body. Before starting work, always attach a static grounding strap or at least touch the metal chassis of the device to discharge any build up of static electricity.

**⚠ Caution** **Memory / Expansion Card Related**

- Similarly, the PCB and soldered areas of the memory modules and expansion cards are also exposed, and can be affected by the natural static electricity generated by the human body. Before starting work, always attach a static grounding strap or at least touch the metal chassis of the device to discharge any build up of static electricity.
- Avoid touching the soldered areas when handling a memory module or expansion card, and instead hold it by the edge of the PCB or the metal bracket.
- As the memory modules and expansion cards are sensitive to static electricity, they should be placed on a conductive pad or left in their conductive wrappings until the last possible moment.

<Memory Size Limits>

Some operating systems place a limit on the amount of memory that can be used. Check with your OS supplier as to whether any such limits apply.

# USB Device Installation Precautions

When attaching USB devices to the Plug-N-Run G5 Development Board, note that some USB devices can cause the system to stop responding, or can remain unrecognized after the power is turned on. If this type of problem occurs, try the following steps:

- Reboot the OS
- Detach the device from the USB port, then reattach it
- If hardware configuration restrictions prevent USB port devices from being detached/reattached, turn the Plug-N-Run G5 Development Board power off then back on again a few seconds later, and reboot the system
- Check that the USB cable being used is able to handle the data transfer speeds required by the device
- Check that the latest version of the USB driver and/or firmware is being used
- Check that the power supply to the device is sufficient for its needs

# Replacing Batteries

- ⚠ Caution** The Plug-N-Run G5 Development Board has a battery (CMOS RAM battery) on board to retain data such as BIOS information.
- Do not touch the battery. Never install or remove the battery by yourself. Doing so may cause electric shock or static electricity which can damage the device.
  - If the settings for the BIOS setup are not saved correctly, the battery may be worn out. In this case, please contact your PFU Systems sales support person for assistance.

## Advanced Safety Measures

This product was designed and manufactured for general use; for situations such as general industrial use. It was not designed or manufactured for uses that involve direct and serious risk to life such as nuclear control systems, aircraft auto-pilot control systems, air traffic control systems, major traffic control systems, medical life support equipment, military missile launch controls systems, or any other situations that require a high degree of safety or in which such a degree of safety cannot be ensured.

Do not use this product unless taking appropriate measures to ensure safety in such situations. When using this product in the above-mentioned situations, contact our service engineer.

## Layout Of This Manual

### Chapter 1 Overview

Provides a brief overview of the Development Board.

### Chapter 2 Features

Describes implemented features of the Development Board.

### Chapter 3 Board Mechanical Specifications

Provides dimensions of the Development Board.

### Chapter 4 On-board Devices

Provides on-board devices of the Development Board.

### Chapter 5 Interface Specifications

Describes Development Board I/O interface connector pin assignments.

# Symbols Used In This Manual

The following symbols are used in this manual:



**Note** Explains supplementary details.  
Read as necessary.

**Caution** Draws attention to a precaution that should be observed.  
Alternately warns of an unacceptable or dangerous practice.  
Should always be read!

**Refer** References related information in a different area of this manual,  
or in another manual.

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# Chapter 1 Overview

This chapter provides a brief overview of the Development Board.

## Introduction

The Plug-N-Run G5 Development Board (PS5PRDEVBD) is a full-featured board in a 284mm × 304.8mm footprint. It provides standard connectors for easy access to all of the COM Express compliant Plug-N-Run E1/G5 module interfaces such as SATA, IDE, SDVO, LVDS LCD, CRT, TV-Out, LAN, USB, COM, FDD, LPT, PS/2, Audio, LPC bus, SMBus, I2C and GPIO. In addition to the legacy 32-bit/33MHz PCI bus expansion slots, the x1 PCI Express slots permit high bandwidth I/O expansion. The x16 PCI Express Graphics slot allows the use of external high-performance graphics hardware including SDVO-to-DVI transmitter. An other additional feature is an external Flash ROM socket that can be used for BIOS development and customization. Since all core system functions are integrated in the board, this provides shorter time-to-market, lower development costs, and reduced development risk for your embedded system. The Development Board is readily connected to peripherals through on-board connectors. An on-board RJ45 connector offers 10/100Mbps Ethernet connectivity. The Development Board can be configured with any of the following Plug-N-Run E1/G5 products:

- 2.16GHz Plug-N-Run E1
- 1.50GHz Plug-N-Run E1



**Caution** Plug-N-Run G5 Development Board should be used for the Plug-N-Run E1/G5. Note that if the Plug-N-Run E1 is mounted on the Plug-N-Run G5 Development Board, the CNLANUSB1 LAN port will not be usable.

Table 1 contains the main Plug-N-Run G5 Development Board specifications.

**Table 1 Plug-N-Run G5 Development Board Specifications**

Item	Specification	
Model Number	PS5PRDEVBD	
External Dimensions (W × D)	284.0 × 304.8 mm	
Plug-N-Run E1/G5 module	440-pin mezzanine connector, COM Express type 2 pin-out	
PCI Express Graphics Port	1 × x16 Lane (shared with SDVO slot)	
PCI Express Bus	1 × x8 Lane (only x1 Lane is supported) 3 × x1 Lane PCI Express 1.0a compliant	
PCI Bus	2 × 3.3V PCI Slots, 2 × 5V PCI Slots (*1), 32-bit/33MHz, PCI Rev. 2.3	
I/O Interfaces	Parallel Serial IDE Serial ATA FDD CRT TV OUT LVDS	1 × 26-pin header
		2 × D-SUB 9-pin connector, 4 × 10-pin header
		1 × 40-pin header
		4 × 7-pin connector (*2)
		1 × 34-pin header (720KB / 1.44MB, 2-mode)
		1 × Hidensity D-SUB 15-pin connector
		1 × 7-pin header, 1 × 8-pin header (*3)
		2 × 20-pin header

**Table 1 Plug-N-Run G5 Development Board Specifications**

Item	Specification
USB	4 × Type-A connector, 2 × 10-pin header (each header has 2 ports)
Keyboard	1 × PS/2-Compatible 6-pin MINI-DIN (*4)
Mouse	1 × PS/2-Compatible 6-pin MINI-DIN (*4)
LAN	1 × RJ45 connector, SPEED/LINK/ACTIVE LED 10/100/1000Base-T
Audio	1 × MIC-IN, 1 × Line-IN, 1 × Line-OUT
LPC Bus	1 × 20-pin header, LPC Rev. 1.0
SMBus/I2C	1 × 10-pin header, SMBus2.0
GPIO	1 × 10-pin header
ExpressCARD	1 × 10-pin header
External ROM	1 × PLCC 32-pin
Speaker	1 × Piezo-electric Buzzer
Indicator LEDs	2 × Numeric Block LED for POST code (for debug use), 1 × HDD Access LED, 4 × Power LED, 1 × Thermal Sensor Alarm. 1 × Module Type Alarm
Switches	1 × Power Switch (Push Button Type), 1 × Reset Switch (Push Button Type), 2 × Wake Switch (Push Button Type), 1 × Battery Low Switch (Push Button Type), 1 × THRM Switch (Push Button Type)
Power Supply	1 × ATX Power Supply Connector, 1 × 12V Power Supply Connector, 1 × Backup Battery (CR2032), 1 × LCD Backlight Power Supply Connector, 3 × 12V FAN Power Supply Connector, 1 × 5V FAN Power Supply Connector, DC-DC Converter
Operation Environment	Temperature Humidity
	0 – 50°C 20 – 80% RH, no condensation
Storage Environment	Temperature Humidity
	-20 – 65°C 0 – 90% RH, no condensation
Supply Voltage	+3.3V +5V +12V -12V
	+3.0 – +3.6V +4.5 – +5.5V +10.8 – +13.2 -13.2 – -10.8V
	Time for each supply to reach 90% of spec voltage from 0V.
Mezzanine Connector Lifetime	2 – 20mS 30 Insertions / Removals

\*1 Do not use 5V PCI slots with the Plug-N-Run E1 because it does not support 5V PCI.

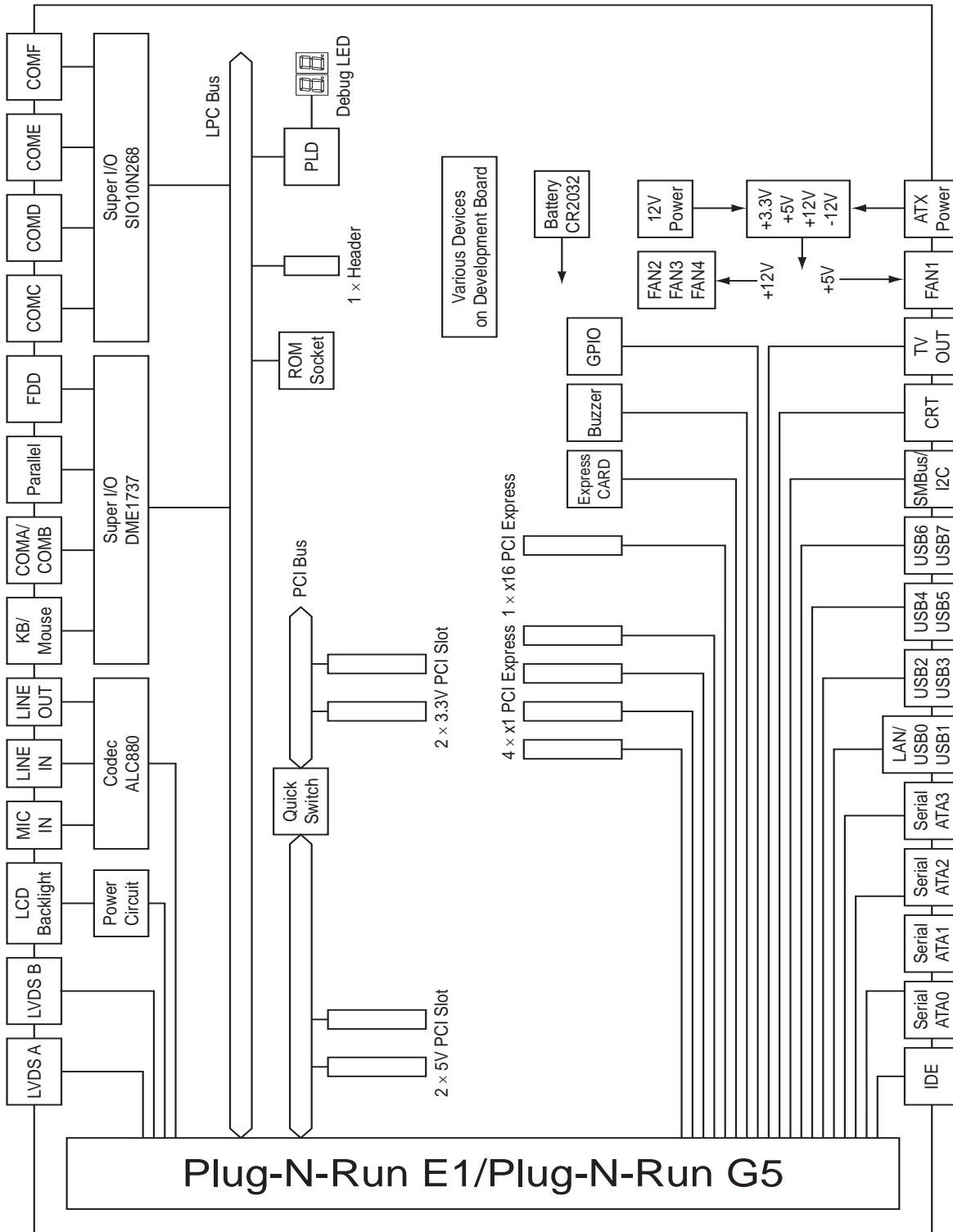
\*2 The number of usable Serial ATA connectors (from CNSATA0 – CNSATA3) depends on the Plug-N-Run model. For example, if the Plug-N-Run supports three Serial ATA ports, CNSATA0, CNSATA1, and CNSATA2 may be used.

\*3 7-pin connector and 8-pin header cannot be used simultaneously.  
JPTVA/JPTVB/JPTVC 1-2 short: 7-pin connector  
2-3 short: 8-pin header

\*4 A PS/2 compatible BIOS is required if a PS/2 keyboard and mouse are to be used. Refer to the *B/OS Manual* for your System-On-Module for details.

## Block Diagram

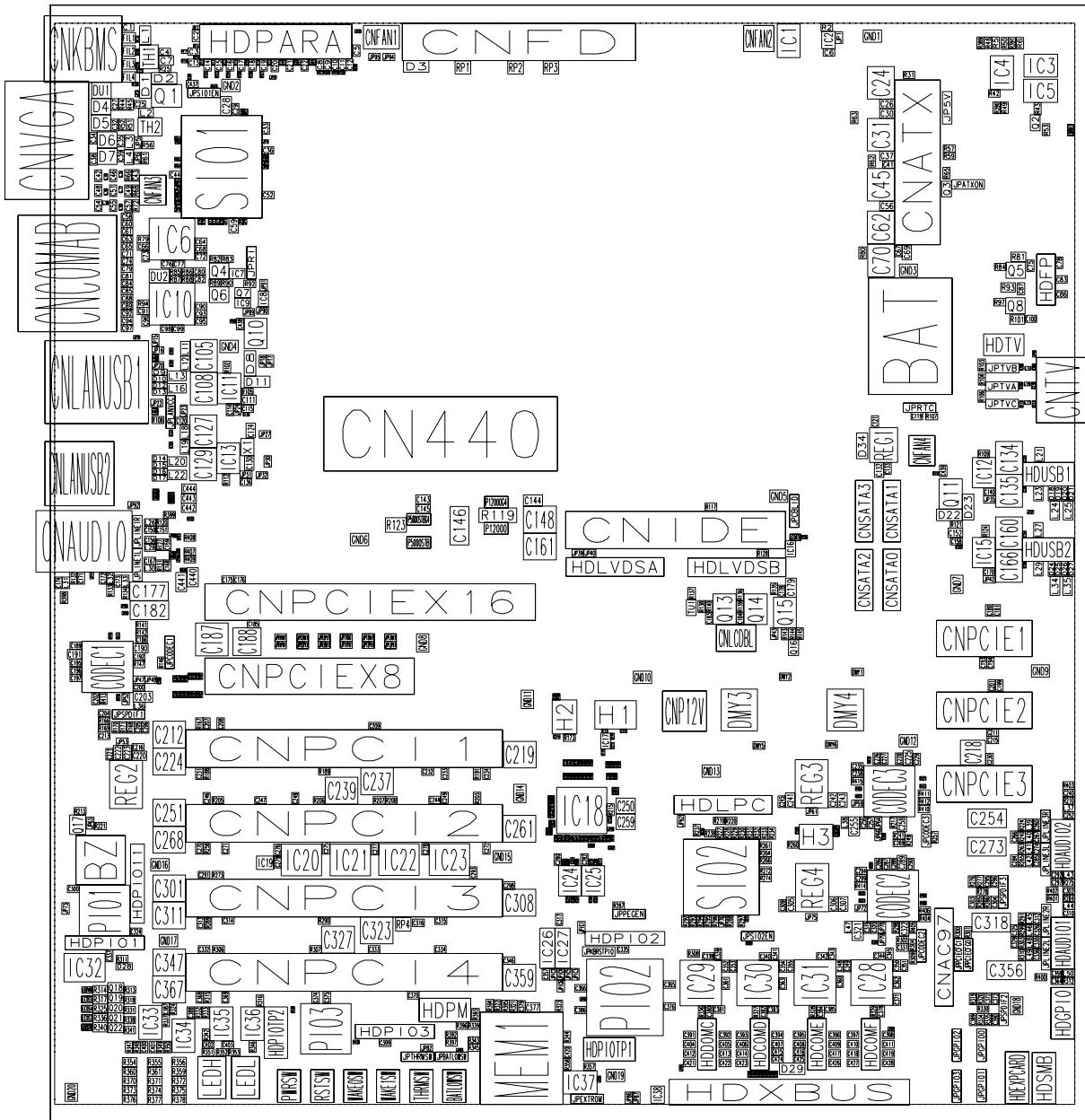
Figure 1 shows the block diagram for the Plug-N-Run G5 Development Board.



**Figure 1 Development Board Block Diagram**

# Board Layout

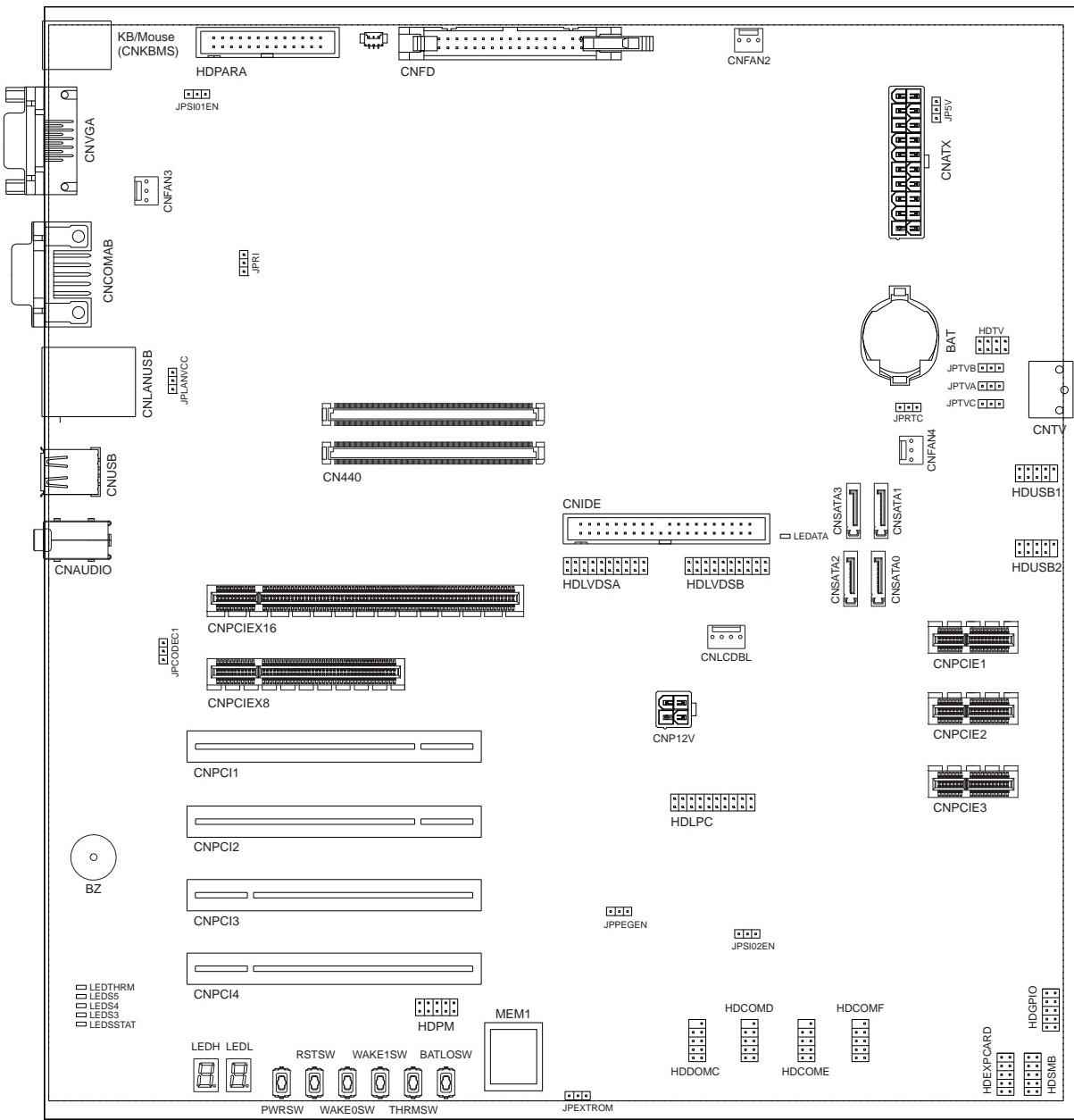
Figure 2 shows the layout of the Development Board.



**Figure 2 Top View of Development Board**

## Connectors & Jumpers

Figure 3 shows the appearance of the Development Board.



### **Figure 3 Development Board Layout**

# Connectors

Note that manufacture and model number details for the on-board connectors are representative of those used on the board, but at times individual connectors may be replaced by items that are equivalent but not identical (with respect to manufacturer and model number.)

**Table 2 Development Board Connectors**

Part No.	Function	Type	Development Board Connector (Manufacturer / Model)	Mating Connector (Manufacturer / Model)
CNP12V	12V Power	4-pin	Molex / 39-28-1043	Molex / Housing: 39-01-2040 Terminal: 39-00-0038
CN440	Plug-N-Run E1/ G5 module	SMD 440-pin	Tyco Electronics Corporation / 5mm: 3-1827233-6 8mm: 3-5353652-6	Tyco Electronics Corporation / 3-1318490-6 (on Plug-N-Run E1/G5 module)
CNATX	ATX Power	20-pin	Molex / 39-28-1203	Molex / Housing: 39-01-2200 Terminal: 39-00-0038
CNAUDIO	MIC-IN Line-IN Line-OUT	18-pin	Tyco Electronics / 1470166-1	(Stereo mini plug φ3.5)
CNCOMAB	COMA/COMB	2 × 9-pin	Foxconn Electronics Inc. / DM10151-70	JAE / Body: DE-9SF-N Cover: DE-C4-J6-F1
CNFAN1	5V FAN	3-pin	Hirose Electric Co., Ltd. / DF13C-3P-1.25V(21)	Hirose Electric Co., Ltd. / DF13-3S-1.25C(21)
CNFAN2	12V FAN	3-pin	Molex / 22-23-2031	Molex / Housing : 22-01-3037 Terminal : 97-00-0445
CNFAN3				
CNFAN4				
CNFD	FDD	34-pin	Fujitsu Component / FCN704Q034-AU/M	Honda Tsushin / MFC-34RPF
CNIDE	3.5" IDE	40-pin	Tyco Electronics Corporation / 440094-1	(ATA 66/100 80-pin IDE cable, ATA 33 40-pin IDE cable)
CNKBM	KB / Mouse	12-pin	Foxconn Electronics Inc. / MH11061-PD2	Tyco Electronics Corporation / Plug shell: 84165-2 Housing: 84167-1 Connector: 84141-2
CNLANUSB1	LAN/USB	30-pin	Pulse Engineering Inc. / JW0-0006	(LAN cable)
CNLANUSB2	USB 2.0	8-pin	FCI / 72309-0040B	(USB cable)
CNLCD	LCD Backlight	4-pin	Molex / 22-23-2041	Molex / Housing : 22-01-3047 Terminal : 97-00-0445
CNPC1	5V PCI Slots	120-pin	Tyco Electronics Corporation / 145167-4	(PCI Board)
CNPC2				
CNPC3	3.3V PCI Slots	120-pin	Tyco Electronics Corporation / 145167-4	(PCI Board)
CNPC4				
CNPCIE1	x1 PCI Express	36-pin	Tyco Electronics Corporation / 1612163-1	(PCI Express Board)
CNPCIE2				
CNPCIE3				
CNPCIE16	x16 PCI Express Graphics Port	164-pin	Tyco Electronics Corporation / 1612163-4	(PCI Express Board)
CNPCIE8	x8 PCI Express	98-pin	Tyco Electronics Corporation / 1612163-3	(PCI Express Board)
CNSATA0	Serial ATA	9-pin	Tyco Electronics Corporation / 67491-0010	(Serial ATA cable)
CNSATA1				
CNSATA2				
CNSATA3				
CNTV	TV Out	7-pin	Hosiden Corporation / TCS7709-27-218	(S-Video cable)

**Table 2 Development Board Connectors**

<b>Part No.</b>	<b>Function</b>	<b>Type</b>	<b>Development Board Connector (Manufacturer / Model)</b>	<b>Mating Connector (Manufacturer / Model)</b>
CNVGA	CRT	15-pin	JAE / D02-M15SAG-21L9	JAE / Plug: D02-M15PG-F0 Shell: DE-C8-J9-F5-1 Terminal: D02-22-22P-PKG100
HDCOMC	COMC/COMD/	10-pin	Honda Tsushin / FFC-10T10BMEP1B#01	Honda Tsushin / MFC-10RPF
HDCOMD	COME/COMF			
HDCOME				
HDCOMF				
HDEXP-CARD	ExpressCARD	10-pin	Iriso Electronics Co., Ltd. / 9201B-2-10E-GR	Honda Tsushin / MFC-10RPF
HDGPIO	GPIO	10-pin	Iriso Electronics Co., Ltd. / 9201B-2-10E-GR	Honda Tsushin / MFC-10RPF
HDLPC	LPC Bus	20-pin	Honda Tsushin / FFC-20T10BMEP1B	Honda Tsushin / MFC-20RPF
HDLVDSA	LVDS A port	20-pin	Honda Tsushin / FFC-20T10BMEP1B	Honda Tsushin / MFC-20RPF
HDLVDSB	LVDS B port	20-pin	Honda Tsushin / FFC-20T10BMEP1B	Honda Tsushin / MFC-20RPF
HDPARA	Parallel	26-pin	Hirose Electric Co., Ltd. / HIF3FC-26PA-2.54DSA	Hirose Electric Co., Ltd. / HIF3B-26D-2.54R
HDSMB	SMBus	10-pin	Iriso Electronics Co., Ltd. / 9201B-2-10E-GR	Honda Tsushin / MFC-10RPF
HDTV	TV Out	8-pin	Honda Tsushin / FFC-8BMEP1	Honda Tsushin / MFC-8RPF
HDUSB1	USB 2.0	10-pin	Honda Tsushin / FFC-10T10BMEP1B#01	Honda Tsushin / MFC-10RPF
HDUSB2				
MEM1	External ROM	32-pin	Yamaichi Electronics Co., Ltd. / IC160-0324-300	(ROM) (*1)

# Switches and Indicator LEDs

## Switches

Table 3 lists the switches found on the Development Board.



**Table 3 Development Board Switches**

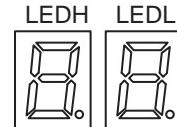
Switch	Function
PWRSW	Flips the S1/S3/S4/S5 state to the S0 state, and vice-versa.
RSTSW	Sets the entire device to be reinitialized when the power is turned on.
WAKE0SW	This switch sets the WAKE0# signal Low (active).
WAKE1SW	This switch sets the WAKE1# signal Low (active).
BATLLOWSW	This switch sets the BATLLOW# signal Low (active).
THRMSW	This switch sets the THRMSW# signal Low (active).



**Caution** It is forbidden to press the RSTSW button during the POST (Power On Self Test) phase.

## LEDH, LEDL (2-digit Numeric LED)

The 2-digit LED on the Development Board is used to display diagnostic codes (the values written to port 80h) during the POST phase.



For details of the port 80h codes see the *Beep & Diagnostic Codes* section in Chapter 1 Overview of the *Plug-N-Run E1 BIOS Manual*.

## LEDATA (IDE Device Access)

The LEDATA turns on when the ATA Devices (PATA and/or SATA) are accessed.

## LEDTHRM

The LEDTHRM turns on when the CPU temperature rises above the normal operating limit (125°C).

## LEDTCFLT

This LED lights up when an unsupported Plug-N-Run module is installed on the G5 Development Board.

The G5 Development Board cannot be turned on when it is in this state.

## LEDS3, LEDS4, LEDS5, LEDSSTAT

These LEDs indicate the status of ACPI mode as shown below.

**Table 4 LED Function**

LED	LED Status on each ACPI State				
	S0	S1	S3	S4	S5
LEDS3	OFF	OFF	ON	ON	ON
LEDS4	OFF	OFF	OFF	ON	ON
LEDS5	OFF	OFF	OFF	OFF	ON
LEDSSTAT (*1)	OFF	OFF	ON	ON	ON

\*1 LEDSSTAT is connected to the SUS\_STAT# signal to show the status of it.

## On-Board Backup Battery

**Table 5 CMOS Backup Battery Specification**

Item	Specification
Battery	Manganese Dioxide Lithium
Model	CR2032
Nominal Voltage	3V
Nominal Capacity	220mAh
Size	20.0mm (diameter) × 3.2mm (height)

## External ROM

MEM1 is used to mount an external ROM.

An M50FW080K5 (from ST Micro Electronics) or equivalent device may be used.

JPEXTROM must be shorted across pins 2-3 if an external ROM is to be used.

### MEM1

PIN#	SIGNAL	PIN#	SIGNAL
1	_P3300	17	LPC_AD3
2	RP#	18	(NC)
3	(Pull up)	19	(NC)
4	(Pull up)	20	(NC)
5	(Pull up)	21	(NC)
6	(Pull up)	22	(NC)
7	(Pull up)	23	LPC_FRAME#
8	(Pull up)	24	(Pull up)
9	ID3	25	_P3300
10	ID2	26	GND
11	ID1	27	(NC)
12	ID0	28	(NC)
13	LPC_AD0	29	(Pull down)
14	LPC_AD1	30	(Pull up)
15	LPC_AD2	31	LPCCLK_FWH
16	GND	32	_P3300

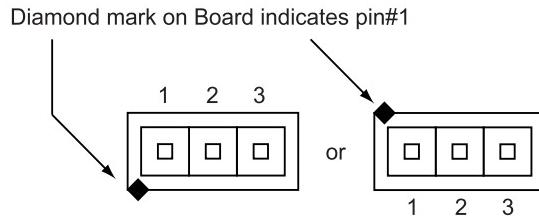
Connector Model# [Manufacturer] : IC160-0324-300 [Yamaichi Electronics] or equivalent(\*1)

\*1 The connector is not carried in PS5PRDEVBD.

# Jumper Settings

Table 6 shows factory default jumper settings on the Development Board.

The position of jumper pin #1 is clearly marked on the silk screen of the Development Board as shown below.

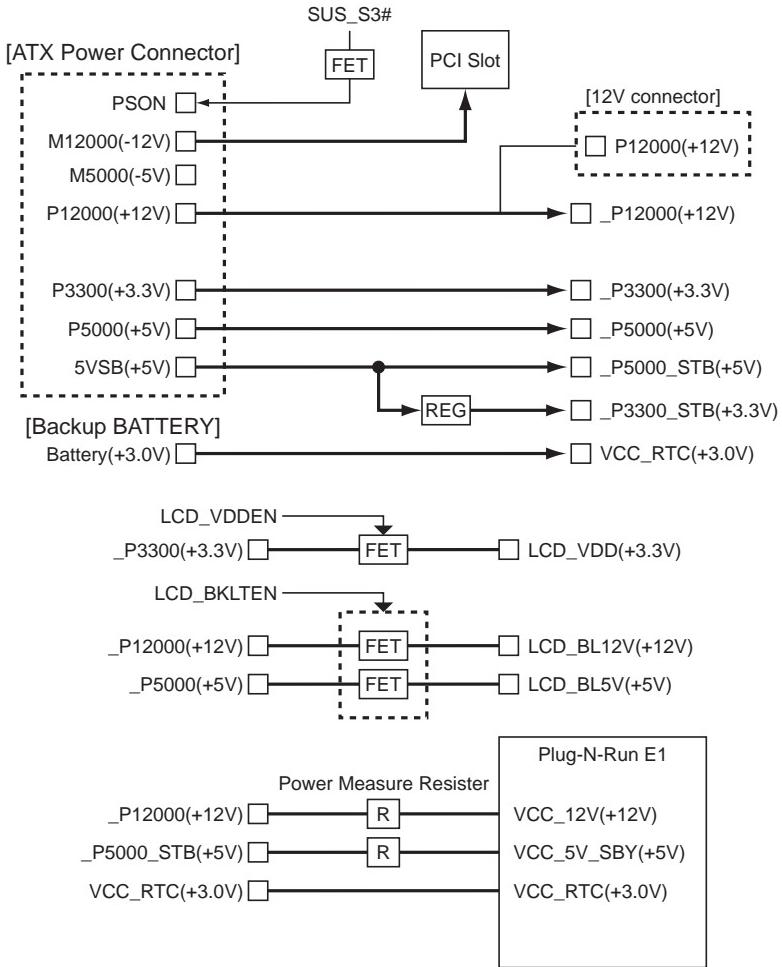


**Table 6 Development Board Jumper Settings**

Terminal #	Setting	Default	Function
JPLANVCC	1-2 shorted		Not allowed
	2-3 shorted	(default)	CT signal is connected
JP5V	1-2 shorted	(default)	Enables the ATX power supply's standby power supply
	2-3 shorted		Not allowed
JPBAT-LOWSW	1-2 shorted	(default)	Enables the BATLOWSW
	2-3 shorted		Pins the BATLOW# signal low
JPCBLID	1-2 shorted	(default)	Used for shipping & adjustment purposes
	2-3 shorted		Not allowed
JPCODEC1	1-2 shorted	(default)	Enables CODEC1
	2-3 shorted		Disables CODEC1
JPEXTROM	1-2 shorted	(default)	Disables the external ROM (MEM1)
	2-3 shorted		Enables the external ROM (MEM1)
JPRI	1-2 shorted	(default)	RING_INDICTE# signal is not connected to the WAKE1# signal
	2-3 shorted		RING_INDICTE# signal is connected to the WAKE1# signal
JPRTC	1-2 shorted	(default)	Supplies VCC_RTC from a Lithium battery
	2-3 shorted		Not allowed
JPSIO1EN	1-2 shorted	(default)	Enables SIO1
	2-3 shorted		Disables SIO1
JPSIO2EN	1-2 shorted	(default)	Enables SIO2
	2-3 shorted		Disables SIO2
JPTHRMSW	1-2 shorted	(default)	Enables the THRMSW
	2-3 shorted		Pins the THRM# signal low
JPRTVA	1-2 shorted	(default)	Enables CNTV
	2-3 shorted		Enables HDTV
JPRTVB	1-2 shorted	(default)	Enables CNTV
	2-3 shorted		Enables HDTV
JPRTVC	1-2 shorted	(default)	Enables CNTV
	2-3 shorted		Enables HDTV

# Power Supply

Figure 4 shows the various power supply systems of the Development Board. Sufficient power should be provided to the ATX Power Connector as well as to the Backup Battery to supply the Plug-N-Run E1/G5 module and all other connected devices.



**Figure 4 Development Board Power Supplies**



**Note** An ATX power supply suitable for use with the Development Board is included in the Development Board Kit.



**Refer** See the label on the ATX power supply for details of its power supply specifications.

# Mezzanine Connector Specification

Table 7 shows the specifications of the Development Board Mezzanine Connector (Tyco Electronics Corporation 6-1218151-1.)

**Table 7 Mezzanine Connector Specification**

Parameter	Value
Manufacturer	Tyco Electronics Corporation
Mating Connector Part Number	6-1318151-1 (4mm), 6-1318154-1 (8mm)
Rated Current	0.5A max
Rated Voltage	50V AC max
Temperature	-40°C to 85°C (0 – 95% RH)
Contact Resistance	55mΩ max. (initial)
Insulating Resistance	500MΩ min. (initial)
Voltage Tolerance	0.2kV AC (for 1 minute)
Insertion Force	0.9N (90gf) max/pin
Removal Force	0.1N (10gf) min/pin
Insertion/Removal Life	30 cycles
Shock	50G
Vibration	No electrical discontinuity greater than 1µ sec when mating connector is subjected to a 10-55-10Hz cycle, traversed in 1 minute at 1.52mm amplitude
Thermal Shock	DR=20mW max (after 5 cycles of 30 minutes each at -40°C, then 85°C)
Solder Coverage	95% min
Solder Flux	Alpha 100 (or equivalent)
Solder Conditions	3 ± 0.5 seconds at 230°C ± 5°C (recommended)

## Cautions

### When Using the Development Board

- Because the electrical circuits of the Development Board are exposed, conductive materials (including dust) settling on the surface of the Development Board can cause short circuits. Avoid using the Development Board in dusty environments.
- When using the Development Board, take anti-static measures to prevent permanent damage to the electronic components.
- Always make sure that the power supply is OFF before attaching/removing connectors.
- As the Development Board is a bare board, with no frame or casing, a non-conductive sheet should always be spread on the workbench where the board will be used.

# Chapter 2 Features

This chapter describes the features of the Development Board.

## x16 PCI Express Graphics (1 Slot)

The Development Board provides one x16 PCI Express Graphics slot.

## x8 PCI Express (1 Slot)

The Development Board provides one x8 PCI Express slot (only x1 Lane is supported).

## x1 PCI Express (3 Slots)

The Development Board provides three x1 PCI Express slots.

## 32-bit/33MHz PCI Bus (4 Slots)

The Development Board provides two 3.3V and two 5V 32-bit/33MHz PCI slots.

## Serial (6 Connectors)

Six 16550A compatible RS232 serial ports are provided through two standard 9-pin D-SUB Male Connectors and four 10-pin headers.

## Parallel (1 Port)

One SPP/EPP/ECP compatible parallel port is provided through one 26-pin header.

## IDE Hard Disk Drive (1 Connector)

The Development Board has one IDE Interfaces, which supports up to two devices.

## Serial ATA (4 Connectors)

The Development Board has four Serial ATA connectors. The Plug-N-Run E1 supports only two connectors of them.

## Floppy Disk Drive (1 Connector)

One 3.5" floppy disk drive may be attached. The FDD controller is µPD765A compatible. Two types of media may be used: 2DD (720KB) and 2HD (1.44MB).

## CRT (1 Connector)

A CRT display can be connected to the Development Board using the integrated graphic controller on the Plug-N-Run E1/G5 module.

## **TV OUT (1 Connector)**

The Development Board provides one TV OUT connector and one header. These connectors cannot be used at the same time.

## **LVDS LCD (2 Connectors)**

The Development Board provides two LVDS LCD connectors to support either one single-channel panel or one dual-channel panel.

## **USB (8 Ports)**

The Development Board provides four USB 2.0 ports and two 10-pin headers which support USB 2.0. Each of headers provides two ports. This means that up to eight USB ports are supported in total.

## **Keyboard and Mouse (1 Port each)**

The Development Board supports standard PS/2 compatible keyboard and mouse ports.

## **10/100 Mbps Ethernet (1 RJ45 Connector)**

The Development Board supports one RJ45 LAN port.

## **Audio (3 Connectors)**

The Development Board utilizes the REALTEK ALC880 Intel High Definition Audio Codec and provides one connector each for MIC-In, Line-In, and Line-Out.

## **LPC Bus (1 Connector)**

The Development Board provides one 20-pin LPC Bus header for expansion.

## **SMBus (1 Connector)**

The Development Board provides one 10-pin SMBus header for connecting system management devices.

## **GPIO (1 Connector)**

The Development Board brings out GPIO signals on the Plug-N-Run E1/G5 module to a 10-pin header. They are useful when debugging and evaluating customized setups.

## **ExpressCARD (1 Connector)**

The Development Board provides one ExpressCARD header to support the ExpressCARD.

## **FAN (4 Connectors)**

The Development Board provides four fan power supply connectors that make it possible to manage and evaluate the thermal environment appropriately.

# Chapter 3 Board Mechanical Specifications

This chapter describes the information necessary to configure the Plun-N-Run E1.

## Plug-N-Run E1/G5 Module Attachment

- 1 Place the Development Board on a steady flat surface.
- 2 Lining up the pairs of Mezzanine Connectors, place the Plug-N-Run E1/G5 module on the Development Board. The holes in the module PCB should line up with the four mounting spacers on the Development Board. Attach the Plug-N-Run E1/G5 to the Development Board using the mounting hardware contained in the 5mm Assembly Kit. Make sure the Plug-N-Run E1/G5 is attached with proper underside support provided by the mounting hardware.



Caution

- A heat-sink plus fan combination (or similar) should be used to ensure proper cooling of the Plug-N-Run E1/G5.
- Do not use the connectors CNPCI1 and CNPCI2 with the Plug-N-Run E1 because it does not support 5V PCI.

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# Chapter 4 On-board Devices

This chapter provides specification for the on-board devices of the Development Board.

## Super I/O

The Development Board has two Super I/O devices, DME1737 and SIO10N268.

## REALTEK ALC880 Audio Codec

The development board utilizes the REALTEK ALC880 Intel High Definition audio codec that interfaces to the Intel High Definition audio Link on the Plug-N-Run E1/G5 module and provides Line-Out, Line-In and Mic-In.

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# Chapter 5 Interface Specifications

This chapter provides details on pin assignments and signal names for each individual interface.

Note that in the connector signal tables that follow, a "(NC)" indicates that the signal is not connected, a "(Pull Up)" indicates that the signal is pulled up on the Development Board, and a "(Pull Down)" indicates that the signal is pulled down on the Development Board.



**Caution** Some commonly available interface cables are known to use different pin assignments (signal, power and ground line position) to those of the Plug-N-Run E1/G5 interfaces. Make sure to only use cables with pin assignments that match those of the Plug-N-Run E1/G5.

## 440-pin Connector

CN440

Row A			
PIN#	SIGNAL	PIN#	SIGNAL
1	GND	56	PCIE_TX4_N
2	GBE0_MDI3_N	57	GND
3	GBE0_MDI3_P	58	PCIE_TX3_P
4	GBE0_LINK100#	59	PCIE_TX3_N
5	GBE0_LINK1000#	60	GND
6	GBE0_MDI2_N	61	PCIE_TX2_P
7	GBE0_MDI2_P	62	PCIE_TX2_N
8	GBE0_LINK#	63	GPI1
9	GBE0_MDI1_N	64	PCIE_TX1_P
10	GBE0_MDI1_P	65	PCIE_TX1_N
11	GND	66	GND
12	GBE0_MDI0_N	67	GPI2
13	GBE0_MDI0_P	68	PCIE_TX0_P
14	GBE0_CTREF	69	PCIE_TX0_N
15	SUS_S3#	70	GND
16	SATA0_TX_P	71	LVDS_A0_P
17	SATA0_TX_N	72	LVDS_A0_N
18	SUS_S4#	73	LVDS_A1_P
19	SATA0_RX_P	74	LVDS_A1_N
20	SATA0_RX_N	75	LVDS_A2_P
21	GND	76	LVDS_A2_N
22	SATA2_TX_P	77	LVDS_VDD_EN
23	SATA2_TX_N	78	LVDS_A3_P
24	SUS_S5#	79	LVDS_A3_N
25	SATA2_RX_P	80	GND
26	SATA2_RX_N	81	LVDS_A_CK_P
27	BATLOW#	82	LVDS_A_CK_N
28	ATA_ACT#	83	LVDS_I2C_CK

Row A			
PIN#	SIGNAL	PIN#	SIGNAL
29	AC_SYNC	84	LVDS_I2C_DAT
30	AC_RST#	85	GPI3
31	GND	86	KBD_RST#
32	AC_BITCLK	87	KBD_A20GATE
33	AC_SDOUT	88	PCIE_CK_REF_P
34	BIOS_DISABLE#	89	PCIE_CK_REF_N
35	THRMTrip#	90	GND
36	USB6_N	91	RESERVED
37	USB6_P	92	RESERVED
38	USB_6_7_OC#	93	GPO0
39	USB4_N	94	RESERVED
40	USB4_P	95	RESERVED
41	GND	96	GND
42	USB2_N	97	VCC_12V
43	USB2_P	98	VCC_12V
44	USB_2_3_OC#	99	VCC_12V
45	USB0_N	100	GND
46	USB0_P	101	VCC_12V
47	VCC_RTC	102	VCC_12V
48	EXCD0_PERST#	103	VCC_12V
49	EXCD0_CPPE#	104	VCC_12V
50	LPC_SERIRQ	105	VCC_12V
51	GND	106	VCC_12V
52	PCIE_TX5_P	107	VCC_12V
53	PCIE_TX5_N	108	VCC_12V
54	GPI0	109	VCC_12V
55	PCIE_TX4_P	110	GND

Row B			
PIN#	SIGNAL	PIN#	SIGNAL
1	GND	56	PCIE_RX4_N
2	GBE0_ACT#	57	GPO2
3	LPC_FRAME#	58	PCIE_RX3_P
4	LPC_AD0	59	PCIE_RX3_N
5	LPC_AD1	60	GND
6	LPC_AD2	61	PCIE_RX2_P
7	LPC_AD3	62	PCIE_RX2_N
8	LPC_DRQ0#	63	GPO3
9	LPC_DRQ1#	64	PCIE_RX1_P
10	LPC_CLK	65	PCIE_RX1_N
11	GND	66	WAKE0#
12	PWRBTN#	67	WAKE1#
13	SMB_CK	68	PCIE_RX0_P
14	SMB_DAT	69	PCIE_RX0_N
15	SMB_ALERT#	70	GND
16	SATA1_TX_P	71	LVDS_B0_P
17	SATA1_TX_N	72	LVDS_B0_N
18	SUS_STAT#	73	LVDS_B1_P
19	SATA1_RX_P	74	LVDS_B1_N
20	SATA1_RX_N	75	LVDS_B2_P

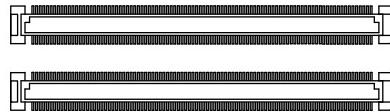
<b>Row B</b>			
<b>PIN#</b>	<b>SIGNAL</b>	<b>PIN#</b>	<b>SIGNAL</b>
21	GND	76	LVDS_B2_N
22	SATA3_TX_P	77	LVDS_B3_P
23	SATA3_TX_N	78	LVDS_B3_N
24	PWR_OK	79	LVDS_BKLT_EN
25	SATA3_RX_P	80	GND
26	SATA3_RX_N	81	LVDS_B_CK_P
27	WDT	82	LVDS_B_CK_N
28	AC_SDIN2	83	LVDS_BKLT_CTRL
29	AC_SDIN1	84	VCC_5V_SBY
30	AC_SDINO	85	VCC_5V_SBY
31	GND	86	VCC_5V_SBY
32	SPKR	87	VCC_5V_SBY
33	I2C_CK	88	RESERVED
34	I2C_DAT	89	VGA_RED
35	THRM#	90	GND
36	USB7_N	91	VGA_GRN
37	USB7_P	92	VGA_BLU
38	USB_4_5_OC#	93	VGA_HSYNC
39	USB5_N	94	VGA_VSYNC
40	USB5_P	95	VGA_I2C_CK
41	GND	96	VGA_I2C_DAT
42	USB3_N	97	TV_DAC_A
43	USB3_P	98	TV_DAC_B
44	USB_0_1_OC#	99	TV_DAC_C
45	USB1_N	100	GND
46	USB1_P	101	VCC_12V
47	EXCD1_PERST#	102	VCC_12V
48	EXCD1_CPPE#	103	VCC_12V
49	SYS_RESET#	104	VCC_12V
50	CB_RESET#	105	VCC_12V
51	GND	106	VCC_12V
52	PCIE_RX5_P	107	VCC_12V
53	PCIE_RX5_N	108	VCC_12V
54	GPO1	109	VCC_12V
55	PCIE_RX4_P	110	GND

<b>Row C</b>			
<b>PIN#</b>	<b>SIGNAL</b>	<b>PIN#</b>	<b>SIGNAL</b>
1	GND	56	PEG_RX1_N
2	IDE_D7	57	TYPE1#
3	IDE_D6	58	PEG_RX2_P
4	IDE_D3	59	PEG_RX2_N
5	IDE_D15	60	GND
6	IDE_D8	61	PEG_RX3_P
7	IDE_D9	62	PEG_RX3_N
8	IDE_D2	63	RESERVED
9	IDE_D13	64	RESERVED
10	IDE_D1	65	PEG_RX4_P
11	GND	66	PEG_RX4_N
12	IDE_D14	67	RESERVED

Row C			
PIN#	SIGNAL	PIN#	SIGNAL
13	IDE_IORDY	68	PEG_RX5_P
14	IDE_IOR#	69	PEG_RX5_N
15	PCI_PME#	70	GND
16	PCI_GNT2#	71	PEG_RX6_P
17	PCI_REQ2#	72	PEG_RX6_N
18	PCI_GNT1#	73	SDVO_I2C_DAT
19	PCI_REQ1#	74	PEG_RX7_P
20	PCI_GNT0#	75	PEG_RX7_N
21	GND	76	GND
22	PCI_REQ0#	77	RESERVED
23	PCI_RESET#	78	PEG_RX8_P
24	PCI_AD0	79	PEG_RX8_N
25	PCI_AD2	80	GND
26	PCI_AD4	81	PEG_RX9_P
27	PCI_AD6	82	PEG_RX9_N
28	PCI_AD8	83	RESERVED
29	PCI_AD10	84	GND
30	PCI_AD12	85	PEG_RX10_P
31	GND	86	PEG_RX10_N
32	PCI_AD14	87	GND
33	PCI_C/BE1#	88	PEG_RX11_P
34	PCI_PERR#	89	PEG_RX11_N
35	PCI_LOCK#	90	GND
36	PCI_DEVSEL#	91	PEG_RX12_P
37	PCI_IRDY#	92	PEG_RX12_N
38	PCI_C/BE2#	93	GND
39	PCI_AD17	94	PEG_RX13_P
40	PCI_AD19	95	PEG_RX13_N
41	GND	96	GND
42	PCI_AD21	97	RESERVED
43	PCI_AD23	98	PEG_RX14_P
44	PCI_C/BE3#	99	PEG_RX14_N
45	PCI_AD25	100	GND
46	PCI_AD27	101	PEG_RX15_P
47	PCI_AD29	102	PEG_RX15_N
48	PCI_AD31	103	GND
49	PCI IRQA#	104	VCC_12V
50	PCI IRQB#	105	VCC_12V
51	GND	106	VCC_12V
52	PEG_RX0_P	107	VCC_12V
53	PEG_RX0_N	108	VCC_12V
54	TYPE0#	109	VCC_12V
55	PEG_RX1_P	110	GND

Row D			
PIN#	SIGNAL	PIN#	SIGNAL
1	GND	56	PEG_TX1_N
2	IDE_D5	57	TYPE2#
3	IDE_D10	58	PEG_TX2_P
4	IDE_D11	59	PEG_TX2_N

<b>Row D</b>			
<b>PIN#</b>	<b>SIGNAL</b>	<b>PIN#</b>	<b>SIGNAL</b>
5	IDE_D12	60	GND
6	IDE_D4	61	PEG_TX3_P
7	IDE_D0	62	PEG_TX3_N
8	IDE_REQ	63	RESERVED
9	IDE_IOW#	64	RESERVED
10	IDE_ACK#	65	PEG_TX4_P
11	GND	66	PEG_TX4_N
12	IDE_IRQ	67	GND
13	IDE_A0	68	PEG_TX5_P
14	IDE_A1	69	PEG_TX5_N
15	IDE_A2	70	GND
16	IDE_CS1#	71	PEG_TX6_P
17	IDE_CS3#	72	PEG_TX6_N
18	IDE_RESET#	73	SDVO_I2C_CLK
19	PCI_GNT3#	74	PEG_TX7_P
20	PCI_REQ3#	75	PEG_TX7_N
21	GND	76	GND
22	PCI_AD1	77	IDE_CBLID#
23	PCI_AD3	78	PEG_TX8_P
24	PCI_AD5	79	PEG_TX8_N
25	PCI_AD7	80	GND
26	PCI_C/BE0#	81	PEG_TX9_P
27	PCI_AD9	82	PEG_TX9_N
28	PCI_AD11	83	RESERVED
29	PCI_AD13	84	GND
30	PCI_AD15	85	PEG_TX10_P
31	GND	86	PEG_TX10_N
32	PCI_PAR	87	GND
33	PCI_SERR#	88	PEG_TX11_P
34	PCI_STOP#	89	PEG_TX11_N
35	PCI_TRDY#	90	GND
36	PCI_FRAME#	91	PEG_TX12_P
37	PCI_AD16	92	PEG_TX12_N
38	PCI_AD18	93	GND
39	PCI_AD20	94	PEG_TX13_P
40	PCI_AD22	95	PEG_TX13_N
41	GND	96	GND
42	PCI_AD24	97	PEG_ENABLE#
43	PCI_AD26	98	PEG_TX14_P
44	PCI_AD28	99	PEG_TX14_N
45	PCI_AD30	100	GND
46	PCI_IRQC#	101	PEG_TX15_P
47	PCI_IRQD#	102	PEG_TX15_N
48	PCI_CLKRUN#	103	GND
49	RESERVED	104	VCC_12V
50	PCI_CLK	105	VCC_12V
51	GND	106	VCC_12V
52	PEG_TX0_P	107	VCC_12V
53	PEG_TX0_N	108	VCC_12V
54	PEG_LANE_RV#	109	VCC_12V
55	PEG_TX1_P	110	GND



Connector Model# [Manufacturer] : 3-1827233-6 or 3-5353652-6 [Tyco Electronics Corporation] or equivalent

## PCI

5V 32-bit/33MHz PCI cards can be connected to CNPCI1 and CNPCI2. Also, 3.3V 32-bit/33MHz PCI cards can be connected to CNPCI3 and CNPCI4.



**Do not use the connectors CNPCI1 and CNPCI2 with the Plug-N-Run E1 because it does not support 5V PCI.**

### CNPCI1, CNPCI2 (5V PCI)

PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL
A1	(PullUp)	B1	_M12000	A32	PCI_AD16	B32	PCI_AD17
A2	_P12000	B2	(Pull Down)	A33	_P3300	B33	PCI_C_BE2#
A3	(PullDown)	B3	GND	A34	PCI_FRAME#	B34	GND
A4	(PullUp)	B4	(NC)	A35	GND	B35	PCI_IRDY#
A5	_P5000	B5	_P5000	A36	PCI_TRDY#	B36	_P3300
A6	INTA# (*1)	B6	_P5000	A37	GND	B37	PCI_DEVSEL#
A7	INTC# (*1)	B7	INTB# (*1)	A38	PCI_STOP#	B38	GND
A8	_P5000	B8	INTD# (*1)	A39	_P3300	B39	PCI_LOCK#
A9	(NC)	B9	(NC)	A40	(Pull Up)	B40	PCI_PERR#
A10	_P5000	B10	(NC)	A41	(Pull Up)	B41	_P3300
A11	(NC)	B11	(NC)	A42	GND	B42	PCI_SERR#
A12	GND	B12	GND	A43	PCI_PAR	B43	_P3300
A13	GND	B13	GND	A44	PCI_AD15	B44	PCI_C_BE1#
A14	_P3300_STB	B14	(NC)	A45	_P3300	B45	PCI_AD14
A15	PCI_RESET#	B15	GND	A46	PCI_AD13	B46	GND
A16	_P5000	B16	CLK (*1)	A47	PCI_AD11	B47	PCI_AD12
A17	GNT# (*1)	B17	GND	A48	GND	B48	PCI_AD10
A18	GND	B18	REQ# (*1)	A49	PCI_AD9	B49	GND
A19	PCI_PME#	B19	_P5000		(KEY)		(KEY)
A20	PCI_AD30	B20	PCI_AD31		(KEY)		(KEY)
A21	_P3300	B21	PCI_AD29	A52	PCI_C_BE0#	B52	PCI_AD8
A22	PCI_AD28	B22	GND	A53	_P3300	B53	PCI_AD7
A23	PCI_AD26	B23	PCI_AD27	A54	PCI_AD6	B54	_P3300
A24	GND	B24	PCI_AD25	A55	PCI_AD4	B55	PCI_AD5
A25	PCI_AD24	B25	_P3300	A56	GND	B56	PCI_AD3
A26	IDSEL (*1)	B26	PCI_C_BE3#	A57	PCI_AD2	B57	GND
A27	_P3300	B27	PCI_AD23	A58	PCI_AD0	B58	PCI_AD1
A28	PCI_AD22	B28	GND	A59	_P5000	B59	_P5000
A29	PCI_AD20	B29	PCI_AD21	A60	(Pull Up)	B60	(Pull Up)
A30	GND	B30	PCI_AD19	A61	_P5000	B61	_P5000
A31	PCI_AD18	B31	_P3300	A62	_P5000	B62	_P5000

\*1 The signal name is different between CNPCI1 and CNPCI2 as shown in below.

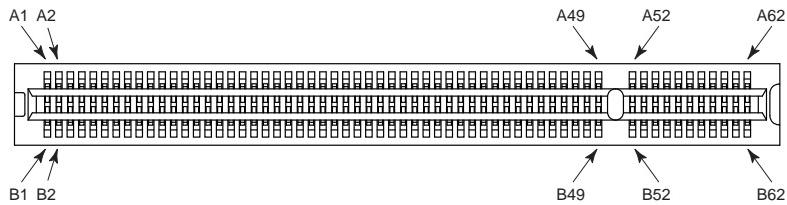
PIN#	Function	CNPCI1	CNPCI2
A6	INTA#	PCI_IRQA#	PCI_IRQB#
B7	INTB#	PCI_IRQB#	PCI_IRQC#
A7	INTC#	PCI_IRQC#	PCI_IRQD#
B8	INTD#	PCI_IRQD#	PCI_IRQA#
A26	IDSEL	PCI_AD20	PCI_AD21
B18	REQ#	PCI_REQ0#	PCI_REQ1#
A17	GNT#	PCI_GNT0#	PCI_GNT1#
B16	CLK	CLK_PCI1	CLK_PCI2

### CNPCI3, CNPCI4 (3.3V PCI)

PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL
A1	(PullUp)	B1	_M12000	A32	PCI_AD_3(16)	B32	PCI_AD_3(17)
A2	_P12000	B2	(Pull Down)	A33	_P3300	B33	PCI_C_BE2_3#
A3	(PullDown)	B3	GND	A34	PCI_FRAME_3#	B34	GND
A4	(PullUp)	B4	(NC)	A35	GND	B35	PCI_IRDY_3#
A5	_P5000	B5	_P5000	A36	PCI_TRDY_3#	B36	_P3300
A6	INTA# (*1)	B6	_P5000	A37	GND	B37	PCI_DEVSEL_3#
A7	INTC# (*1)	B7	INTB# (*1)	A38	PCI_STOP_3#	B38	GND
A8	_P5000	B8	INTD# (*1)	A39	_P3300	B39	PCI_LOCK_3#
A9	(NC)	B9	(NC)	A40	(Pull Up)	B40	PCI_PERR_3#
A10	_P5000	B10	(NC)	A41	(Pull Up)	B41	_P3300
A11	(NC)	B11	(NC)	A42	GND	B42	PCI_SERR_3#
A12	GND	B12	GND	A43	PCI_PAR	B43	_P3300
A13	GND	B13	GND	A44	PCI_AD_3(15)	B44	PCI_C_BE1_3#
A14	_P3300_STB	B14	(NC)	A45	_P3300	B45	PCI_AD_3(14)
A15	PCI_RESET#	B15	GND	A46	PCI_AD_3(13)	B46	GND
A16	_P5000	B16	CLK (*1)	A47	PCI_AD_3(11)	B47	PCI_AD_3(12)
A17	GNT# (*1)	B17	GND	A48	GND	B48	PCI_AD_3(10)
A18	GND	B18	REQ# (*1)	A49	PCI_AD_3(9)	B49	GND
A19	PCI_PME#	B19	_P5000		(KEY)		(KEY)
A20	PCI_AD_3(30)	B20	PCI_AD_3(31)		(KEY)		(KEY)
A21	_P3300	B21	PCI_AD_3(29)	A52	PCI_C_BE0_3#	B52	PCI_AD_3(8)
A22	PCI_AD_3(28)	B22	GND	A53	_P3300	B53	PCI_AD_3(7)
A23	PCI_AD_3(26)	B23	PCI_AD_3(27)	A54	PCI_AD_3(6)	B54	_P3300
A24	GND	B24	PCI_AD_3(25)	A55	PCI_AD_3(4)	B55	PCI_AD_3(5)
A25	PCI_AD_3(24)	B25	_P3300	A56	GND	B56	PCI_AD_3(3)
A26	IDSEL (*1)	B26	PCI_C_BE3_3#	A57	PCI_AD_3(2)	B57	GND
A27	_P3300	B27	PCI_AD_3(23)	A58	PCI_AD_3(0)	B58	PCI_AD_3(1)
A28	PCI_AD_3(22)	B28	GND	A59	_P5000	B59	_P5000
A29	PCI_AD_3(20)	B29	PCI_AD_3(21)	A60	(Pull Up)	B60	(Pull Up)
A30	GND	B30	PCI_AD_3(19)	A61	_P5000	B61	_P5000
A31	PCI_AD_3(18)	B31	_P3300	A62	_P5000	B62	_P5000

\*1 The signal name is different between CNPCI3 and CNPCI4 as shown in below.

PIN#	Function	CNPCI3	CNPCI4
A6	INTA#	PCI_IRQC_3#	PCI_IRQD_3#
B7	INTB#	PCI_IRQD_3#	PCI IRQA_3#
A7	INTC#	PCI IRQA_3#	PCI IRQB_3#
B8	INTD#	PCI IRQB_3#	PCI IRQC_3#
A26	IDSEL	PCI_AD22_3	PCI_AD23_3
B18	REQ#	PCI_REQ2_3#	PCI_REQ3_3#
A17	GNT#	PCI_GNT2_3#	PCI_GNT3_3#
B16	CLK	CLK_PCI3	CLK_PCI4



Connector Model# [Manufacturer] : 145167-4 [Tyco Electronics Corporation] or equivalent

## LPC

A LPC device can be connected to the CNLPC header.

### CNLPC

PIN#	SIGNAL	PIN#	SIGNAL
1	LPCCLK_HD LPC	2	LPC_LFRAME#
3	LPC_LAD0	4	LPC_LAD1
5	LPC_LAD2	6	LPC_LAD3
7	LPC_DRQ1#	8	LPC_SERIRQ
9	PCI_PME#	10	LPC_RST#
11	(NC)	12	(NC)
13	(NC)	14	(NC)
15	(NC)	16	(NC)
17	_P3300	18	_P3300
19	GND	20	GND

19 17 15 13 11 9 7 5 3 1  
 20 18 16 14 12 10 8 6 4 2

Connector Model# [Manufacturer] : FFC-20BMEP1 [Honda Tsushin] or equivalent

## PCI Express Ports

CNPCIE1, CNPCIE2, and CNPCIE3 may have x1-lane PCI Express cards attached.

CNPCIEX8 may have x1-lane to x8-lane PCI Express cards attached.

CNPCIEX16 may have x1-lane to x16-lane PCI Express cards attached.

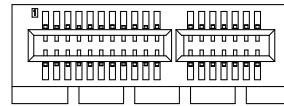


CNPCIEX8 only supports x1-lane use.

**Caution** CNPCIEX16 only supports x1-lane or x16-lane use.

### CNPCIE1, CNPCIE2, CNPCIE3

PIN#	SIDE B	SIDE A
	NAME	NAME
1	_P12000	(NC)
2	_P12000	_P12000
3	_P12000	_P12000
4	SMB_CLK_S0	GND
5	SMB_DATA_S0	(NC)
6	GND	(NC)
7	GND	(NC)
8	_P3300	(NC)
9	(NC)	_P3300
10	_P3300_STB	_P3300
11	WAKE0#	PCIE_RST#
KEY		
12	(NC)	GND
13	GND	REFCLKp(*1)
14	PETp0(*1)	REFCLKn(*1)
15	PETn0(*1)	GND
16	GND	PERp0(*1)
17	(NC)	PERn0(*1)
18	GND	GND



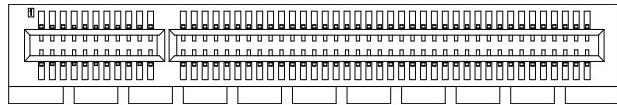
Connector Model# [Manufacturer] : 1612163-1 [Tyco Electronics Corporation] or equivalent

\*1 The signal name is different between CNPCIE1, CNPCIE2, and CNPCIE3 as shown in below.

PIN#	Function	CNPCIE1	CNPCIE2	CNPCIE3
A14	REFCLKp	CLK_PCIEX1_SLOT1	CLK_PCIEX1_SLOT2	CLK_PCIEX1_SLOT3
A15	REFCLKn	CLK_PCIEX1_SLOT1#	CLK_PCIEX1_SLOT2#	CLK_PCIEX1_SLOT3#
A16	PERp0	PCIE1_RX_P_X1	PCIE2_RX_P_X1	PCIE3_RX_P_X1
A17	pERn0	PCIE1_RX_N_X1	PCIE2_RX_N_X1	PCIE3_RX_N_X1
B14	PETp0	PCIE1_TX_P_X1	PCIE2_TX_P_X1	PCIE3_TX_P_X1
B15	PETn0	PCIE1_TX_N_X1	PCIE2_TX_N_X1	PCIE3_TX_N_X1

## CNPCIEX8

PIN#	SIDE B	SIDE A
	NAME	NAME
1	_P12000	(NC)
2	_P12000	_P12000
3	_P12000	_P12000
4	SMB_CLK_S0	GND
5	SMB_DATA_S0	(NC)
6	GND	(NC)
7	GND	(NC)
8	_P3300	(NC)
9	(NC)	_P3300
10	_P3300_STB	_P3300
11	WAKE0#	PCIE_RST#
KEY		
12	(NC)	GND
13	GND	CLK_PCIEX8_SLOT
14	PCIE0_TX_P	CLK_PCIEX8_SLOT#
15	PCIE0_TX_N	GND
16	GND	PCIE0_RX_P
17	(NC)	PCIE0_RX_N
18	GND	GND
19	(NC)	(NC)
20	(NC)	GND
21	GND	(NC)
22	GND	(NC)
23	(NC)	GND
24	(NC)	GND
25	GND	(NC)
26	GND	(NC)
27	(NC)	GND
28	(NC)	GND
29	GND	(NC)
30	(NC)	(NC)
31	(NC)	GND
32	GND	(NC)
33	(NC)	(NC)
34	(NC)	GND
35	GND	(NC)
36	GND	(NC)
37	(NC)	GND
38	(NC)	GND
39	GND	(NC)
40	GND	(NC)
41	(NC)	GND
42	(NC)	GND
43	GND	(NC)
44	GND	(NC)
45	(NC)	GND
46	(NC)	GND
47	GND	(NC)
48	(NC)	(NC)
49	GND	GND



Connector Model# [Manufacturer] : 1612163-3 [Tyco Electronics Corporation] or equivalent



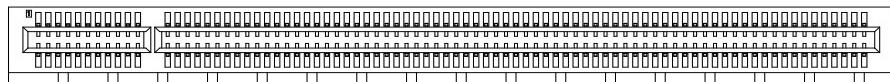
The CNPCIE8 only has the signals required for x1-lane use connected.

**Caution**

### CNPCIE16

PIN#	SIDE B	SIDE A	PIN#	SIDE B	SIDE A
	NAME	NAME		NAME	NAME
1	_P12000	(NC)	41	PCIE0_TX_P(6)	GND
2	_P12000	_P12000	42	PCIE0_TX_N(6)	GND
3	_P12000	_P12000	43	GND	PCIE0_RX_P(6)
4	SMB_CLK_S0	GND	44	GND	PCIE0_RX_N(6)
5	SMB_DATA_S0	(NC)	45	PCIE0_TX_P(7)	GND
6	GND	(NC)	46	PCIE0_TX_N(7)	GND
7	GND	(NC)	47	GND	PCIE0_RX_P(7)
8	_P3300	(NC)	48	(NC)	PCIE0_RX_N(7)
9	(NC)	_P3300	49	GND	GND
10	_P3300_STB	_P3300	50	PCIE0_TX_P(8)	(NC)
11	WAKE0#	PCIE_RST#	51	PCIE0_TX_N(8)	GND
KEY			52	GND	PCIE0_RX_P(8)
12	(NC)	GND	53	GND	PCIE0_RX_N(8)
13	GND	CLK_PCIE16_SL OT	54	PCIE0_TX_P(9)	GND
14	PCIE0_TX_P(0)	CLK_PCIE16_SL OT#	55	PCIE0_TX_N(9)	GND
15	PCIE0_TX_N(0)	GND	56	GND	PCIE0_RX_P(9)
16	GND	PCIE0_RX_P(0)	57	GND	PCIE0_RX_N(9)
17	SDVO_CLK	PCIE0_RX_N(0)	58	PCIE0_TX_P(10)	GND
18	GND	GND	59	PCIE0_TX_N(10)	GND
19	PCIE0_TX_P(1)		60	GND	PCIE0_RX_P(10)
20	PCIE0_TX_N(1)	GND	61	GND	PCIE0_RX_N(10)
21	GND	PCIE0_RX_P(1)	62	PCIE0_TX_P(11)	GND
22	GND	PCIE0_RX_N(1)	63	PCIE0_TX_N(11)	GND
23	PCIE0_TX_P(2)	GND	64	GND	PCIE0_RX_P(11)
24	PCIE0_TX_N(2)	GND	65	GND	PCIE0_RX_N(11)
25	GND	PCIE0_RX_P(2)	66	PCIE0_TX_P(12)	GND
26	GND	PCIE0_RX_N(2)	67	PCIE0_TX_N(12)	GND
27	PCIE0_TX_P(3)	GND	68	GND	PCIE0_RX_P(12)
28	PCIE0_TX_N(0)	GND	69	GND	PCIE0_RX_N(12)
29	GND	PCIE0_RX_P(3)	70	PCIE0_TX_P(13)	GND
30	(NC)	PCIE0_RX_N(0)	71	PCIE0_TX_N(13)	GND
31	SDVO_DATA	GND	72	GND	PCIE0_RX_P(13)
32	GND	(NC)	73	GND	PCIE0_RX_N(13)
33	PCIE0_TX_P(4)	(NC)	74	PCIE0_TX_P(14)	GND
34	PCIE0_TX_N(4)	GND	75	PCIE0_TX_N(14)	GND
35	GND	PCIE0_RX_P(4)	76	GND	PCIE0_RX_P(14)
36	GND	PCIE0_RX_N(4)	77	GND	PCIE0_RX_N(14)

PIN#	SIDE B	SIDE A	PIN#	SIDE B	SIDE A
	NAME	NAME		NAME	NAME
37	PCIE0_TX_P(5)	GND	78	PCIE0_TX_P(15)	GND
38	PCIE0_TX_N(5)	GND	79	PCIE0_TX_N(15)	GND
39	GND	PCIE0_RX_P(5)	80	GND	PCIE0_RX_P(15)
40	GND	PCIE0_RX_N(5)	81	(NC)	PCIE0_RX_N(15)
			82	(NC)	GND



Connector Model# [Manufacturer] : 1612163-4 [Tyco Electronics Corporation] or equivalent

## IDE

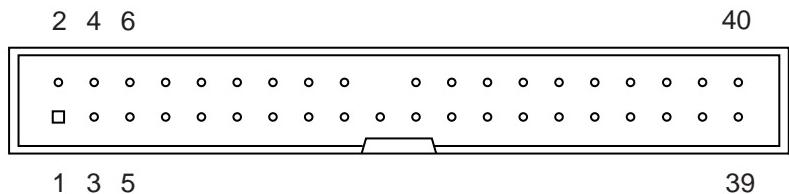
CNIDE may have up to two IDE devices attached via an IDE cable.



**Caution** It is required to use a 40-pin 80-conductor IDE cable when an ATA66/100 IDE device is used.

### CNIDE

PIN#	SIGNAL	PIN#	SIGNAL
1	IDECN_RST#	2	GND
3	IDE_D7	4	IDE_D8
5	IDE_D6	6	IDE_D9
7	IDE_D5	8	IDE_D10
9	IDE_D4	10	IDE_D11
11	IDE_D3	12	IDE_D12
13	IDE_D2	14	IDE_D13
15	IDE_D1	16	IDE_D14
17	IDE_D0	18	IDE_D15
19	GND	20	(KEY)
21	IDE_REQ	22	GND
23	IDE_IOW#	24	GND
25	IDE_IOR#	26	GND
27	IDE_IORDY	28	GND
29	IDE_ACK#	30	GND
31	IDE_IRQ	32	(NC)
33	IDE_A1	34	IDE_CBLID#
35	IDE_A0	36	IDE_A2
37	IDE_CS1#	38	IDE_CS3#
39	IDE_DACTIVE#	40	GND



Connector Model# [Manufacturer] : 440094-1 [Tyco Electronics Corporation] or equivalent

# SATA Connector

CNSATA0 and CNSATA1 may have a single Serial ATA IDE device attached via a Serial ATA cable, one device per connector for a total of up to two Serial ATA devices.

CNSATA2 and CNSATA3 are not available.

## CNSATA0/CNSATA1/CNSATA2/CNSATA3

<b>PIN#</b>	<b>SIGNAL</b>
1	GND
2	SATAx_TX_P
3	SATAx_TX_N
4	GND
5	SATAx_RX_N
6	SATAx_RX_P
7	GND
8	(NC)
9	(NC)



\* x means 0 for CNSATA0, 1 for CNSATA1, 2 for CNSATA2 or 3 for CNSATA3.

Connector Model# [Manufacturer] : 67491-0010 [Molex] or equivalent

# **LAN/USB Connector**

CNLANUSB may be attached to a 10/100 BASE-TX network.

CNLANUSB1, CNLANUSB2, HDUSB1, and HDUSB2 may be attached to a USB2.0 or USB1.1 device.

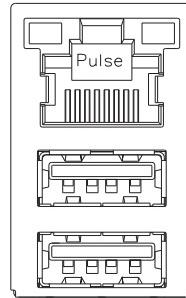
LED's are embedded in the connectors, and function as follows:

Speed: Unlit indicates a 10Mbps connection, lit indicates a 100Mbps connection.

**LINK/ACT:** Lit indicates an established LINK, flashing indicates an active connection.

### CNLANUSB1

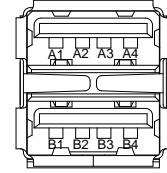
PIN#	LAN SIGNAL
1	CT
2	GBE0_MDI0_P
3	GBE0_MDI0_N
4	GBE0_MDI1_P
5	GBE0_MDI1_N
6	GBE0_MDI2_P
7	GBE0_MDI2_N
8	GBE0_MDI3_P
9	GBE0_MDI3_N
10	GND
PIN#	USB0 SIGNAL
A1	_P5000_USB0
A2	CONN_USB0N
A3	CONN_USB0P
A4	GND
PIN#	USB1 SIGNAL
B5	_P5000_USB1
B6	CONN_USB1N
B7	CONN_USB1P
B8	GND



Connector Model# [Manufacturer] : JW0-0006 {Pulse Engineering, Inc.] or equivalent

### CNLANUSB2

PIN#	SIGNAL
A1	_P5000_USB3
A2	CONN_USB3N
A3	CONN_USB3P
A4	GND
B1	_P5000_USB2
B2	CONN_USB2N
B3	CONN_USB2P
B4	GND

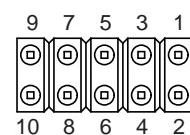


Connector Model# [Manufacturer] : 72309-0040B [FCI] or equivalent

## USB Header

### HDUSB1/HDUSB2

PIN#	SIGNAL	PIN#	SIGNAL
1	_P5000_USBx	2	_P5000_USBy
3	CONN_USBxN	4	CONN_USByN
5	CONN_USBxP	6	CONN_USByP
7	GND	8	GND
9	(KEY)	10	(NC)



\* (x, y) = (4, 5) or (6, 7)

Connector Model# [Manufacturer] : FFC-10T10BMEP1B#01 [Honda Tsushin] or equivalent

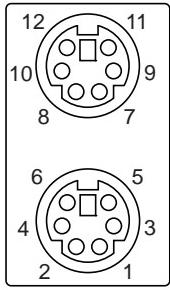
## Keyboard and Mouse

PS/2 type (MINI-DIN 6-pin) keyboard and mouse can be connected to each port.

A PS/2 compatible BIOS is required if a PS/2 keyboard and mouse are to be used. Refer to *Plug-N-Run E1 BIOS Manual* for details.

### CNKB

PIN#	SIGNAL
1	KBC_KBDAT
2	(NC)
3	GND
4	_P5000
5	KBC_KBCLK
6	(NC)
7	KBC_MSDAT
8	(NC)
9	GND
10	_P5000
11	KBC_MSCLK
12	(NC)



Connector Model# [Manufacturer] : MH11061-PD2 [Foxconn Electronics Inc.] or equivalent

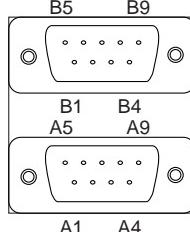
## Serial Port

CNCOMAB has two D-SUB 9-pin connectors that comprise serial ports 1 and 2, each of which may have a cable or device attached.

HDCOMC, HDCOMD, HDCOME, and HDCOMF connect via serial port adapter cables to D-SUB 9-pin connectors for serial ports 3, 4, 5 and 6, each of which may have a cable or device attached.

### CNCOMAB

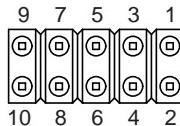
PIN#	SIGNAL	PIN#	SIGNAL
A1	SCDB	B1	SCDA
A2	SRDB	B2	SRDA
A3	STDB	B3	STDRA
A4	STDDB	B4	STDRA
A5	GND	B5	GND
A6	SDSRB	B6	SDSRA
A7	SRTSB	B7	SRTSA
A8	SCTSAB	B8	SCTSA
A9	SRIB	B9	SRIA



Connector Model# [Manufacturer] : DM10151-70 [Foxconn Electronics Inc.] or equivalent

### HDCOMC/HDCOMD/HDCOME/HDCOMF

PIN#	SIGNAL	PIN#	SIGNAL
1	SCDx	2	SDSRx
3	SRDx	4	SRTSx
5	STDx	6	SCTSx
7	SDTRx	8	SRIx
9	GND	10	(NC)



\* x means C for HDCOMC port, D for HDCOMD, E for HDCOME or F for HDCOMF port.

Connector Model# [Manufacturer] : FFC-10T10BMEP1B#01 [Honda Tsushin] or equivalent

## Parallel Port Header

HDPARA connects via a serial port adapter cable to a D-SUB 25-pin connector for a parallel port, which may have a cable or device attached.

### HDPARA

PIN#	SIGNAL	PIN#	SIGNAL
1	LPT_STB#	2	LPT_ALF#
3	LPT_PD0	4	LPT_ERR#
5	LPT_PD1	6	LPT_INIT#
7	LPT_PD2	8	LPT_SLCTIN#
9	LPT_PD3	10	GND
11	LPT_PD4	12	GND
13	LPT_PD5	14	GND
15	LPT_PD6	16	GND
17	LPT_PD7	18	GND
19	LPT_ACK#	20	GND
21	LPT_BUSY	22	GND
23	LPT_PE	24	GND
25	LPT_SLCT	26	(NC)

Connector Model# [Manufacturer] : HIF3FC-26PA-2.54DSA [Hirose Electric Co., Ltd.] or equivalent

## FDD

A single 3.5" floppy disk drive can be connected to CNFDD, the FDD port.

### CNFDD

PIN#	SIGNAL	PIN#	SIGNAL
1	GND	2	FD_DENSEL
3	GND	4	(NC)
5	GND	6	(NC)
7	GND	8	FD_INDEX#
9	GND	10	FD_MTR0#
11	GND	12	(NC)
13	GND	14	FD_DS0#
15	GND	16	(NC)
17	GND	18	FD_DIR#
19	GND	20	(KEY)
21	GND	22	FD_STEP#
23	GND	24	FD_WDATA#
25	GND	26	FD_WGATE#
27	GND	28	FD_TRK0#
29	GND	30	FD_WPR#
31	GND	32	FD_HDSEL
33	GND	34	FD_DSKCHG#

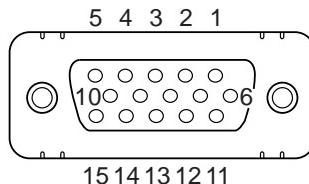
Connector Model# [Manufacturer] : FCN704Q034-AU/M [Fujitsu Component] or equivalent

# CRT

A VGA monitor may be connected to CNVGA, the CRT port.

## CNVGA

PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL
1	VGA_RED	6	GND	11	(NC)
2	VGA_GRN	7	GND	12	VGA_I2C_DAT
3	VGA_BLU	8	GND	13	VGA_HSYNC
4	(NC)	9	(NC)	14	VGA_VSYNC
5	GND	10	GND	15	VGA_I2C_CK



Connector Model# [Manufacturer] : D02-M15SAG-21L9 [JAE] or equivalent

# TV Out

CNTV may have an S-video input display attached.

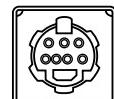
JPTVA, JPTVB and JPTVC must be shorted across pins 1-2 if an CNTV is to be used.

HDTV may have a S-video or Component Video display attached via a cable.

JPTVA, JPTVB and JPTVC must be shorted across pins 2-3 if an HDTV is to be used.

## CNTV

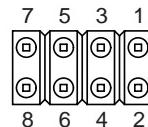
PIN#	SIGNAL
1	GND
2	GND
3	TV_DAC_B
4	TV_DAC_C
5	TV_DAC_A
6	GND
7	GND



Connector Model# [Manufacturer] : TCS7709-27-218 [Hosiden Corporation] or equivalent

## HDTV

PIN#	SIGNAL
1	TV_DAC_A
2	GND
3	TV_DAC_B
4	GND
5	TV_DAC_C
6	GND
7	(NC)
8	GND



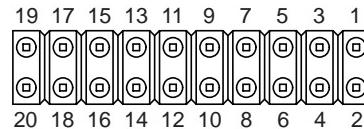
Connector Model# [Manufacturer] : FFC-8BMEP1 [Honda Tsushin] or equivalent

# LVDS LCD Header

HDLVDSA/HDLVDSB

PIN#	SIGNAL	PIN#	SIGNAL
1	LCD_VDD	2	LCD_VDD
3	LVDS_x0_P	4	LVDS_x0_N
5	GND	6	LVDS_x1_P
7	LVDS_x1_N	8	GND
9	LVDS_x2_P	10	LVDS_x2_N
11	GND	12	LVDS_x_CK_P
13	LVDS_x_CK_N	14	GND
15	LVDS_x3_P	16	LVDS_x3_N
17	GND	18	LVDS_I2C_CK
19	LVDS_I2C_DAT	20	LVDS_BKLT_CTRL

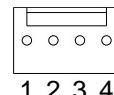
\* x means A for HDLVDSA, or B for HDLVDSB.



Connector Model# [Manufacturer] : FFC-20BMEP1 [Honda Tsushin] or equivalent

CNLcdbL

PIN#	SIGNAL
1	BLP12000
2	GND
3	GND
4	BLP5000

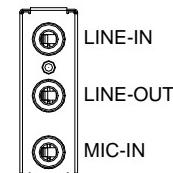


Connector Model# [Manufacturer] : 22-23-2041 [Molex] or equivalent

# Audio

A microphone can be connected to MICIN. LINEIN is used as line input, and LINEOUT is used as line output.

PIN#	SIGNAL	PIN#	SIGNAL	PIN#	SIGNAL
11	GND				
12	MIC_IN_L	22	LINE_OUT_L	32	LINE_IN_L
13	MIC1_JD	23	FRONT1_JD	33	LINE1_JD
14	GND	24	GND	34	GND
15	MIC_IN_R	25	LINE_OUT_R	35	LINE_IN_R



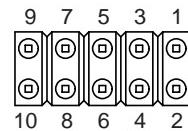
Connector Model# [Manufacturer] : 1470166-1 [Tyco Electronics Corporation] or equivalent

## GPIO

HDGPIO provides general input and output to the Plug-N-Run E1/G5.

### HDGPIO

PIN#	SIGNAL	PIN#	SIGNAL
1	GPI0	2	GPO0
3	GPI1	4	GPO1
5	GPI2	6	GPO2
7	GPI3	8	GPO3
9	WDT	10	(NC)



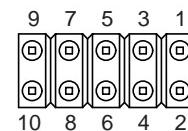
Connector Model# [Manufacturer] : FFC-10T10BMEP1B#01 [Honda Tsushin] or equivalent

## SMBus/I2C

A system management device can be connected to the SMBus header.

### HDSMB

PIN#	SIGNAL	PIN#	SIGNAL
1	I2C_CLK	2	I2C_DAT
3	SMB_CK	4	SMB_DAT
5	SMB_ALERT	6	SMB_CLK_S0
7	SMB_DAT_S0	8	_P3300
9	_P3300_STB	10	GND



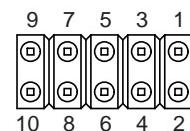
Connector Model# [Manufacturer] : FFC-10T10BMEP1B#01 [Honda Tsushin] or equivalent

## ExpressCARD

HDEXPCARD may have a side-band signal ExpressCARD attached via a cable.

### HDEXPCARD

PIN#	SIGNAL	PIN#	SIGNAL
1	EXCD0_PERST#	2	EXCD0_CPPE#
3	EXCD1_PERST#	4	EXCD1_CPPE#
5	GND	6	GND
7	GND	8	GND
9	GND	10	GND



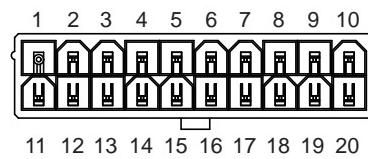
Connector Model# [Manufacturer] : FFC-10T10BMEP1B#01 [Honda Tsushin] or equivalent

## ATX POWER

An ATX Power Supply can be connected to the ATX Power socket.

### CNATX

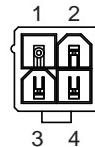
PIN#	SIGNAL	PIN#	SIGNAL
1	_P3300	11	_P3300
2	_P3300	12	_M12000
3	GND	13	GND
4	_P5000	14	ATX_PON
5	GND	15	GND
6	_P5000	16	GND
7	GND	17	GND
8	PWR_OK	18	(NC)
9	_P5000_STB	19	_P5000
10	_P12000	20	_P5000



Connector Model# [Manufacturer] : 39-28-1203 [Molex] or equivalent

### CN12V

PIN#	SIGNAL
1	GND
2	GND
3	_P12000
4	_P12000



Connector Model# [Manufacturer] : 39-28-1043 [Molex] or equivalent

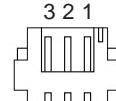
## FAN

CNFAN1 provides a 5V power supply for a fan.

CNFAN2, CNFAN3, and CNFAN4 provide 12V power supplies for fans.

### CNFAN1

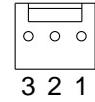
PIN#	SIGNAL
1	GND
2	_P5000
3	(NC)



Connector Model# [Manufacturer] : DF13C-3P-1.25V(21) [Hirose Electric Co., Ltd.] or equivalent

### CNFAN2, CNFAN3, CNFAN4

PIN#	SIGNAL
1	GND
2	_P12000
3	(NC)



Connector Model# [Manufacturer] : 22-23-2031 [Molex] or equivalent

# Appendix A Function Comparative Table

This product is the common development board for Plug-N-Play G5 and E1, but the available functions for each module are different.

Table 8 shows the available functions on two Plug-N-Run modules.

Table 9 and Table 10 show the PCI Express lanes on Plug-N-Run G5 Development Board with Plug-N-Run G5 and E1.

**Table 8 Function Comparative Table**

Functions of G5 Development Board		Plug-N-Run G5	Plug-N-Run E1
CRT	CNVGA	OK	NG
TV OUT	CNTV	OK	NG
LVDS	HDLVDSA,B	OK	NG
PCI Express	CNPCIE1,2,3	OK (*1)	NG
	CNPCIEX16	OK	OK (x4 or x8 only)
	CNPCIEX8	OK (x1 only) (*2)	OK (x1 only) (*2)
PCI	CNPCI1,2	OK	NG (*3)
	CNPCI3,4	OK	OK
IDE	CNIDE	OK	OK
Serial ATA	CNSATA0,1	OK	OK
	CNSATA2	OK	NG
	CNSATA3	NG	NG
USB	CNLANUSB1,2	OK	OK
	HDUSB1,2	OK	NG
LAN	CNLANUSB1	OK	OK
Audio	CNAUDIO	OK	NG (*4)
Keyboard / Mouse	CNKBMS	OK (*5)	OK (*5)
FDD	CNFDD	OK	OK
Parallel port	HDPARA	OK	OK
Serial port	HDCOMA,B,C,D	OK	OK

\*1 PCI Express slots (CNPCIE1,2,3) are available with five x1 lanes for PCI Express setting

on Plug-N-Run G5.

- \***2** The standard Plug-N-Run G5 Development Board supports x1 lane only. To use x4 lane requires the customize of the Development Board. If you need that, please contact your PFU Systems sales support person for assistance.
- \***3** Do not use 5V PCI slots (CNPCI1, CNPCI2) with the Plug-N-Run E1, because it does not support 5V PCI.
- \***4** Plug-N-Run E1 supports AC'97. But it is not available with Plug-N-Run G5 Development Board, because the Development Board has High Definition Audio CODEC but AC'97.
- \***5** A PS/2 compatible BIOS is required if a PS/2 keyboard and mouse are to be used.

**Table 9 PCI Express Lanes with Plug-N-Run G5**

Plug-N-Run G5		G5 Development Board	
Lane	Signal	Connector :	Signal
PCI Express Graphics Interface (one x16 lane)			
one x16 lane	PEG_TX/RX[15:0]+/-	CNPCIEX16 :	PCIE0_TX/RX_P/N[15:0]
PCI Express Interface (five x1 lanes or one x4 lane and one x1 lane)			
five x1 lanes	PCIE_TX/RX[0]+/-	CNPCIEX8 :	PCIE0_TX/RX_P/N
	PCIE_TX/RX[1]+/-	CNPCIE1 :	PCIE1_TX/RX_P/N_X1
	PCIE_TX/RX[2]+/-	CNPCIE2 :	PCIE2_TX/RX_P/N_X1
	PCIE_TX/RX[3]+/-	CNPCIE3 :	PCIE3_TX/RX_P/N_X1
	PCIE_TX/RX[4]+/-	None (*1)	
one x4 lane and one x1 lane	PCIE_TX/RX[3:0]+/-	CNPCIEX8 :	PCIE[3:1]_TX/RX_P/N_X8, PCIE0_TX/RX_P/N (*2)
	PCIE_TX/RX[4]+/-	None (*1)	

\***1** You cannot use PCIE\_TX/RX[4]+/- with Plug-N-Run G5 Development Board, because it does not have the connector.

\***2** The standard Plug-N-Run G5 Development Board supports x1 lane only. To use x4 lane requires the customize of the Development Board. If you need that, please contact your PFU Systems sales support person for assistance.

**Table 10 PCI Express Lanes with Plug-N-Run E1**

Plug-N-Run E1			G5 Development Board
Port	Lane	Signal	Connector : Signal
PCI Express Interface (five x4 lanes, or one x8 lane and two x4 lanes, or two x8 lanes and one x4 lane)			
A	one x8 lane	PCIEA_TX/RX[7:0]+/-	CNPCIEX16 : PCIE0_TX/RX_P/N[7:0]
	two x4 lanes	PCIEA_TX/RX[3:0]+/-	CNPCIEX16 : PCIE0_TX/RX_P/N[3:0]
		PCIEA_TX/RX[7:4]+/-	None (conneting CNPCIEX16) (*1)
B	one x8 lane	PCIEB_TX/RX[7:0]+/-	None (conneting CNPCIEX16) (*1)
	two x4 lanes	PCIEB_TX/RX[3:0]+/-	None (conneting CNPCIEX16) (*1)
		PCIEB_TX/RX[7:4]+/-	None (conneting CNPCIEX16) (*1)
C	two x4 lanes	PCIEC_TX/RX[3:0]+/-	CNPCIEX8 : PCIE[3:1]_TX/RX_P/N_X8, PCIE0_TX/RX_P/N (*2)

**\*1** You cannot use PCIEA\_TX/RX[7:4]+/- (A port with x4 lane) or PCIEB\_TX/RX[7:0]+/- (B port with x8 or x4 lane) with Plug-N-Run G5 Development Board, because it does not have the connector.

**\*2** The standard Plug-N-Run G5 Development Board supports x1 lane only. To use x4 lane requires the customize of the Development Board. If you need that, please contact your PFU Systems sales support person for assistance.

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**Plug-N-Run G5 Development Board User Manual**

**PS-G5PRDEV-UM-010**

**2008.2**

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